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"METHOD OF CRUSHING A TUBE"TECHNICAL FIELD

5 This invention relates to a method of crushing a tube.  
The invention has particular, but not exclusive, application in preparing  
the end of a tube for connection with another member via a conventional fixing  
element such as a bolt.

10 The invention has particular utility in crushing the end of a web. As used  
herein "web" is used to refer to a strut or bracing element which extends  
between the upper and lower chord of a roof truss.

DISCLOSURE OF INVENTION

15 According to one aspect the invention resides in a method of crushing a  
tube, the method including:-  
pressing together opposed portions of the tube such that the opposed  
portions abut to define a land which is adapted to receive a fixing element,  
wherein opposed lateral portions of the tube adjacent the land do not abut but  
20 rather define sub-tubes which straddle the land and which extend lengthwise of  
the tube.

According to another aspect the invention resides in a method of forming  
a flattened region in a tube, the method including pressing together opposed  
portions of the tube, whilst not pressing together lateral opposed portions of the  
25 tube.

According to another aspect the invention resides in a method of forming  
a flattened region in a tube, the method including selectively pinching opposed  
portions of the tube together such that the opposed portions of the tubes abut at  
a central location and such that lateral sub-tubes are defined which straddle the  
30 pinched portion.

According to another aspect the invention resides in a method of forming  
a land on a tube, the method including:-

compressing opposed peripheral portions into abutment to define the land, such that lateral ribs extend along either side of the land, the ribs being formed by the portions of the tube adjacent the abutting portions which define the land.

5 According to another aspect the invention resides in a method of crushing a tube, the method including:-

crushing the tube between a pair of opposed crush members, at least one of the crush members being substantially narrower than the corresponding dimension of the tube and engaging the tube in a substantially central location  
10 whereby a central crushed region is defined between a pair of lateral non-crushed regions, said crushed region being adapted to receive a fixing element.

According to another aspect the invention resides in a tube including a crushed region wherein opposed portions of the tube have been crushed together to abut and define a land which is adapted to receive a fixing element,  
15 the tube further including longitudinally extending non-crushed regions located laterally either side of the crushed region.

According to another aspect the invention resides in a tube including:-  
a land at an end of the tube formed by compressing opposed peripheral portions of the tube into abutment, and  
20 ribs extending along either side of the land and formed by the portions of the tubular member adjacent the abutting peripheral portions.

#### BRIEF DESCRIPTION OF DRAWINGS

25 Reference will now be made to the accompanying Figures which illustrate preferred embodiment of the invention and in which:-

FIG 1 is a plan view of a tube having a crushed or flattened end;  
FIG 2 is a frontal elevation of the tube of FIG 1;  
FIG 3 is a right side elevation of the tube of FIG 1 with a bolt head  
30 present;  
FIG 4 is a right side elevation of the tube of FIG 1 with the bolt head absent; and

FIG 5 is a right side elevation of the tube of FIG 1 with the nut and bolt present and with the tube fastened to a planer surface.

BEST MODE

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Referring firstly to FIG 1, there is shown in plan a metallic tube 10. Tube 10 may be, for example, a web which in use extends between the upper and lower chords of a roof truss.

10 Tube 10 is originally formed from a planer sheet of material which is folded about a longitudinal axis to define the tube with an overlapping longitudinal seam 12 as best shown in FIG 2.

The seam may be welded, riveted, glued or fixed by any known means. However, the preferred embodiment utilises an integral stitching method which swages together material in the overlapping seam region.

15 With reference to FIG 2, it will be noted that the end of the tube is tapered in frontal elevation. Furthermore, referring to FIG 1, a substantially triangular region 14 is more aggressively tapered and is pressed together into an abutting relationship adjacent the end of the tube.

20 Referring to FIG 3, it will be noted that in a central region 18 the opposed peripheral portions of the tube are crushed together so as to be abutting and planer. In contrast, open sections 20 are defined either side of the central crushed region 18. Each of the open sections 20 defines a sub-tube or rib which extends longitudinally of the tube 10 either side of the central crushed region 18.

25 The central crushed region 18 is adapted to receive a fixing element by virtue of one or more punched holes 16. As shown in FIG 3, the punched hole 16 receives a fixing element in the form of a nut and bolt arrangement 22.

30 The central crushed region 18 provides a flattened land which is adapted to receive a conventional fixing element such as nut and bolt arrangement 22. In contrast, the lateral non-crushed regions 20 provide additional structural strength as compared to a tube in which the entire end of the tube is pinched into an abutting relationship.

Referring now to FIG 5, it will be noted that when the tube is fastened a planer surface (eg the upper or lower chord of a truss), the end of the tube is deformed in that ribs or sub-tubes 20 are deformed upwardly in a wing-like manner by virtue of the engagement of the underside of the tube with the planer

5 surface of the chord. It will be appreciated that upward wing-like deformation of the sub-tubes 20 occurs under load, ie. the bolt is under tension as it is tightened. This results in a secure joint between the tube and chord.

It will, of course, be realised that the above has been given by way of illustrative example of the invention. Any variations, modifications, or omissions,

10 as would be apparent to persons skilled in the art, are deemed to fall within the broad scope of this invention.